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The recent Diffusion of Cholera in Europe.

G.B., Local Government Board.

To the President of the Local Government Board.

Sir,

I BEG leave to bring under your notice the accompanying Report, which I have received from Mr. John Netten Radcliffe, on last year's diffusion of Asiatic Cholera in parts of Continental Europe; a diffusion which, as you are aware, became during the summer so extensive as to excite much alarm in this country, and of which, even at the present time, the consequences cannot be said to have ended.

The Report is mainly founded on communications which the Lords of the Council, as administrators of the Quarantine Act and, till recently, of the Diseases Prevention Act, have received from other departments of Her Majesty's Government, with regard to the movements of Cholera in foreign countries. In the Medical Department, I have for some years assigned to Mr. Radcliffe the duty of examining all such communications, and noting their results: a duty which he has discharged with much care and learning; and no doubt you will remember, as founded on this class of communications, and as having been laid before Parliament in the Appendix to my Eighth Annual Report, Mr. Radcliffe's lucid exposition of the steps of the great Cholera-migration which infected Egypt and Turkey in the middle of 1865, and rapidly led to our own considerable visitation of 1865-66.

In Mr. Radcliffe's present Report the special interest attaches to his important suggestion that a new route is in rapid course of development for the conveyance of Asiatic Cholera into Europe; and that probably the Continental infection which attracted public notice here last year, but which seems to have begun two years previously, entered Russia in 1869 by this, then comparatively undeveloped, new channel of intercourse. The route to which Mr. Radcliffe refers, as one of vastly increased and increasing traffic, is that which, traversing Transcaucasia from east to west, and having Tiflis at about its mid-point, brings the Black Sea into free relations with the Caspian and with Northern Persia; a route which within the last few weeks has had a railway opened for its western half, and of which the eastern half is in course of having the same accommodation provided for it.

It must, I fear, be admitted as a real and not inconsiderable danger, that, in proportion as movement becomes quicker from Persia and India towards the great market-places and railway-centres of Europe, Europe may be found to have lost one of the best protections it has hitherto enjoyed against frequent incursions of Asiatic Cholera.

If this consideration is highly important to England, evidently it is of still greater and more immediate importance to the more eastward countries of Europe; and those countries, if the danger is as estimated, are, of course, most deeply concerned in the object of devising securities against it. Possibly Mr. Radcliffe's line of study may have been anticipated in one or more of those countries; and possibly Russia, which, if Mr. Radcliffe is right, has already so severely suffered through the new channel of infection, may now be on her guard against future like importations. Since, however, nothing to any such effect appears in any of the communications which have reached this Department, and since it would, I believe, be of interest to foreign epidemiologists, observant of the migrations of Cholera, that they should have before them in Mr. Radcliffe's Report, if they do not already otherwise know, the facts which he brings into prominence, I would venture to suggest that the Report might perhaps with advantage be brought under notice of the other Governments concerned in the subject-matter; and I would accordingly propose for your approval that, with this object, it should be submitted for Earl Granville's consideration.

I have the honour to be, Sir,

Your obedient servant,

JOHN SIMON.

Medical Department of the Privy Council
and Local Government Board.

June 8, 1872.

The recent Diffusion of Cholera in Europe.

*To John Simon, Esq., F.R.S., D.C.L. Oxon, Medical Officer of the Privy Council
and of the Local Government Board.*

Sir,

I BEG to submit to you the following observations on the recent diffusion of cholera in Europe.

According to the official information in the possession of this Department, the diffusion began in South Russia, at Kiev, in the autumn of 1869. Kiev had suffered from cholera in 1865, and again in 1866. On the 25th August, 1869, the disease re-appeared in the city, and it persisted there until the following December. In the course of October of the same year, or early in November, and during the months of November and December, cholera appeared in several of the districts of the government of Kiev, and in a few localities of the Governments of Poltava and Volhynia, in South Russia; of Tula and Orel, in the central provinces; and of Minsk, Smolensk, and Vitebsk, in West Russia.

In January of the following year, 1870, cholera appeared in Moscow; and, in February, cases were reported in Novgorod. During the summer and autumn the disease became active, and spread more widely in the governments of Tula and Orel, and it broke out in the government of Kursk, in the central provinces, south of Orel; in the governments of Kherson and Kharkov, in South Russia, the latter Government lying immediately south of Kursk; and in the government of Astracan, at Tzaritzin, on the Volga. Cholera also during this period broke out in the Baltic provinces, at St. Petersburg (August 29th); in the south-east it spread along the south-east coast of the Crimea and the north-east coast of the Sea of Azov (attacking Theodosia, Kertch, Berdiansk, Taganrog, and Rostov on the Don); and it extended along the north-east coast of the Black Sea from the Straits of Kertch to Poti, appearing in the latter port and its neighbourhood in August. At this period cholera was widely prevalent in Transcaucasia, the disease having broken out at Nakitchewan, Tiflis, Kutais, and along the course of the Rion.

Thus, in 1870, cholera prevailed with hardly a break—if, indeed, with any break—throughout the tract of country lying between Moscow and the north coasts of the Black Sea and the Sea of Azov. To the north and west of this tract the disease had manifested itself in an active form on the west coast of the Empire, at St. Petersburg; and to the south and east it appeared along the north-east coast of the Black Sea, from the Straits of Kertch to Poti, through the valley of the Rion, across Transcaucasia to the Persian frontier of the Empire.

In 1871 cholera was generally diffused throughout Russia in Europe. The disease extended from the north coasts of the Black Sea and Sea of Azov, in the south, to the south coast of the White Sea (Onega and Archangel), in the north; and from the Polish frontier and Baltic coast, in the west, to the Ural Mountains, in the east. It spread also into Siberia, and, at the time of the latest news, it was prevalent in the governments of Tomsk and Yenesi. In the autumn the disease was reported to have appeared at Astracan, and to have become prevalent in Ciscaucasia, along the course of the Kouban; and, in Transcaucasia, it was present at Baku on the west coast of the Caspian, and at Erivan.

During the whole progress of this remarkable diffusion of cholera the disease did not spread into Europe beyond the limits of the Russian Empire, so far as I am aware, except at four points. In July it passed the Polish frontier into East Prussia, and, on the 24th of the month, attacked Königsberg, "the chief

northern outlet of the great Slavonic Empire.* In August it extended to Memel, Dantzg, Elbing, Stettin, and Swinemunde, and the districts adjoining these ports; scattered cases were also recorded in Berlin;† and outbreaks of the disease occurred in Hamburgh and Altona. On the 3rd September cholera appeared on the west coast of the Gulf of Bothnia, at Hernosand, in Sweden; and at the same date it broke out on the Bosphorus, at Constantinople. In October cholera was reported to be present on the Danube, at Sulina and Galatz; and in November at Tultcha.

At the commencement of August an outbreak took place in Asia Minor, at at Brusa in Anatolia, which appears to have been connected with the Russian epidemic. Brusa is a considerable commercial town, with a port at Mudania, on the Sea of Marmora. At the time of the outbreak, cholera was prevalent at the ports of Kherson, Nicolaiev, Taganrog, and Rostov on the Don, to the north; and at Bagdad and several points in Turkish Kurdistan, in the vicinity of the Persian frontier, and in the province of Azerbaijan, in Persia, to the east and south-east. Previous to the outbreak, cholera had spread largely along the courses of the Euphrates and Tigris, within the pachalik of Bagdad, and extended into Eastern and Northern Arabia.

From Brusa cholera spread to the surrounding district; and, subsequently to the appearance of the disease at Constantinople, cases occurred in the lazaret at Salonica and in the vicinity of that town, and in the lazaret at Varna, in European Turkey; in the Island of Cerigo; at St. Jean d'Acre, on the east coast of Asia Minor, and at Samsoon and Trebizond, on the north coast; and at Amasia, in the interior of Anatolia. The cases at Salonica and Varna occurred among passengers who had recently arrived there by ordinary steam transit from Constantinople. The first case at St. Jean d'Acre was landed from a Russian steam-vessel, coming also from Constantinople.

On the 10th October an ill-furnished emigrant steam-ship sailed from Stettin for New York, touching at Copenhagen and Christiansand. About a week after this vessel had left Christiansand cholera appeared among the passengers, 610 in number. She put into Halifax, Nova Scotia, November 6th, and introduced cholera into that city and into the village of Chezetcook, twenty-five miles north of Halifax.‡

In the course of September two cases of cholera were imported by steam-ships from Hamburgh into England, both into the port of Hartlepool. One of these cases, which ended fatally, was imported on the 7th of the month; the other, which recovered, on the 18th.

It may be well to note here that about the same period in 1871 that cholera began to spread actively in Northern Europe, it commenced also to spread from the head of the Persian Gulf, along the courses of the Shat-el-Arab, the Euphrates, and the Tigris, within the pachalik of Bagdad, in which province the disease had appeared at Meshed Ali, in December of the previous year. In March, cholera being then at Bushire, the disease broke out at Kurna, a village at the junction of the Tigris and Euphrates, and at Bassora; and in the course of the spring it extended to the Arab tribes in the vicinity of the Shat-el-Arab, spread along the Euphrates, attacking successively Madina, Sook-el-Siook, Samava, Divanieh, Hillah, Meshed Ali (where, as already stated, cholera was present in 1870), and Meshed Hussein. Ascending the Tigris, it also attacked Esbiah and Kut-el-Amara, and the Beni-Lama Arabs; and in the summer it broke out at Bagdad. Subsequently, but at a date not known, Khanikin, on the Turco-Persian frontier, Suleimanieh and Kerkook were attacked.

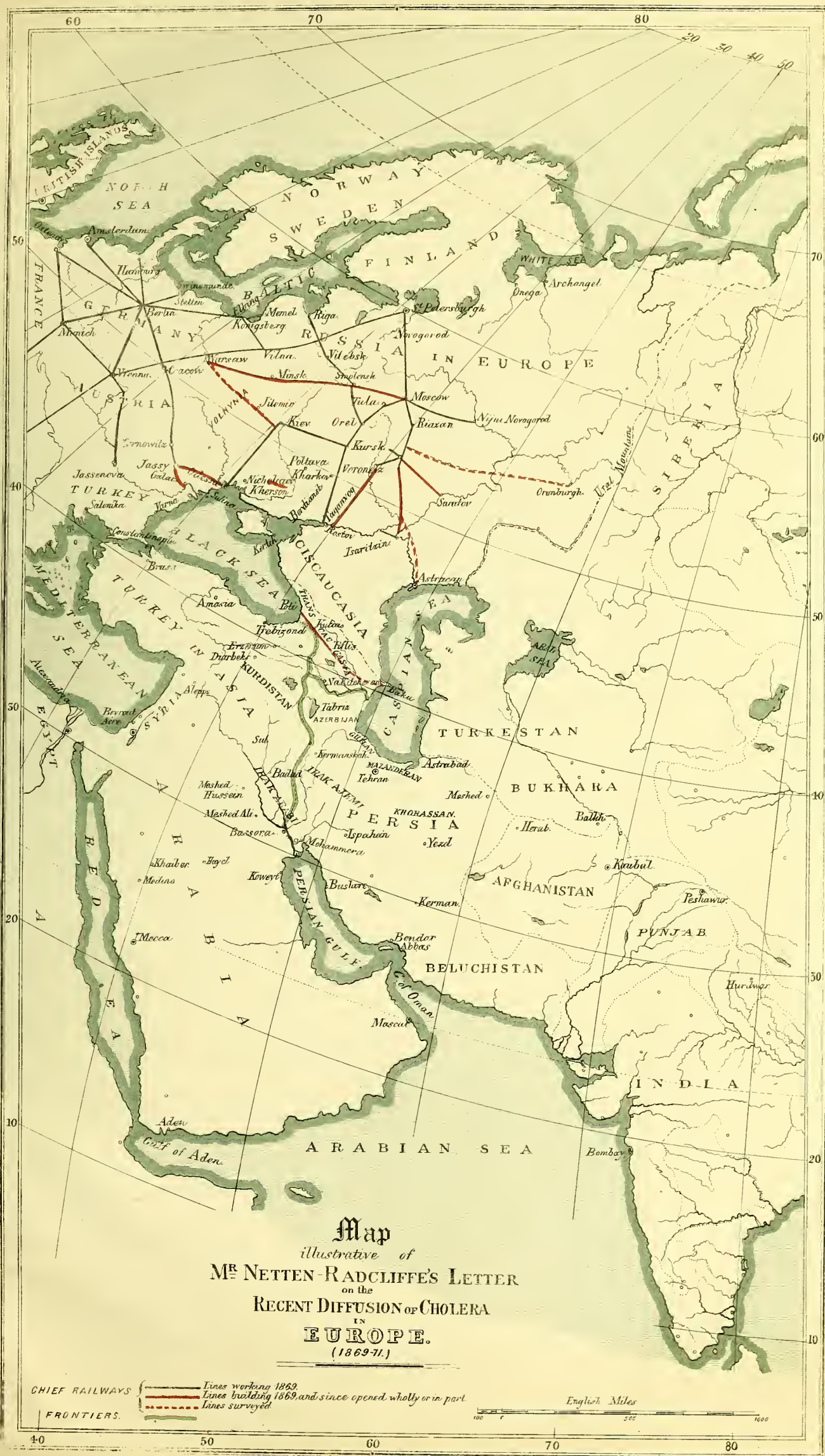
Early in the summer of 1871 a Turkish expeditionary force became affected with cholera at Bassora as it was about to embark for Koweyt, on the north-east coast of the Persian Gulf, and carried the disease into Eastern Arabia. About the middle of June cholera broke out at Hayel,§ in the Djebel Shomar, Northern Arabia, introduced there, it is stated, by an infected caravan, coming from Meshed Hussein. From Hayel the disease passed, two months later, to Khaiber, three


* Mr. Rumbold, Her Majesty's Secretary of Embassy, St. Petersburg. — *Commercial Reports*, 1871, p. 101.

† M. Fauvel states: "Le 19 Août le choléra éclatait à Posen, le 20 à Potsdam, le 21 à Marien-Werder, le même jour dans le Schleswig-Holstein, le 29 à Francfort sur l'Oder." — *Bulletin de l'Académie de Médecine*, t. xxxvi, p. 984 (1871).

‡ See a Report by Dr. S. M. V. Lloyd, Deputy Inspector-General of Hospitals. — *Lancet*, February 17, 1872, p. 226.

§ See on the caravan route from Bagdad and Meshed Ali, through Hayel to Medina and Mecca, and the annual Perso-Meccan caravan, W. Gifford Palgrave's "Narrative of a Year's Journey through Central and Eastern Arabia" (1862-63), vol. i, pp. 195-197.





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days' journey from Medina; and about the middle of September it broke out seriously at Medina, at a time when numerous pilgrims were in the town. In November cases are stated to have occurred in Mecca; and in December a severe outbreak took place on the east coast of the Red Sea, at Gonfudah, south of Jedda. The disease appeared at Gonfudah among troops recently arrived from Constantinople, and it prevailed chiefly among the garrison. Cases are also reported to have occurred towards the close of the year at Jedda and Yembo.

The source of the remarkable diffusion of cholera in Europe during 1869, 1870, and 1871, which I have attempted briefly to describe, is a question of considerable scientific interest. I believe also, that so far as Europe is concerned, this question has practical bearings of no little moment.

Dr. Pelikan, the Director of the Imperial Medical Department of Russia, is of opinion (according to Dr. Fauvel), that the diffusion was not a new epidemic, but that it was a recrudescence of the epidemic of 1865; and this opinion is accepted by Dr. Fauvel.*

It is not without great diffidence that I venture to express a doubt as to the accuracy of the opinion here stated. But, having regard to the persistence and extent of the diffusion of cholera in Northern Europe in 1869, 1870, and 1871, and to the migratory character assumed by the disease in the last-named year, I think that such an opinion ought not to be received, without considerable hesitation, until the probability of the diffusion being an ordinary migration of cholera from Persia and Hindostan can be more definitely set aside than the data at present accessible to me appear to warrant. I confess, at the outset, that the doubt which besets me on this subject may possibly arise mainly from imperfections of the official and other data in my possession. Up to the time that Dr. Pelikan's statement, made by Dr. Fauvel before the Academy of Medicine, of the uninterrupted persistence of cholera in Russia, from 1865 to 1869, became known to me, I was under the impression, guided by the data to which I have referred, that epidemic manifestations of the cholera outbreak of 1865 had ceased in that Empire early in 1868. And, adopting Dr. Pelikan's general statement that this was not the case, I cannot, with the existing data, accept the theory of recrudescence as explaining all the phenomena of the diffusion.

This diffusion was preceded by the most considerable development of cholera in North Persia, particularly in the Caspian provinces of the kingdom, that had occurred for several years. Previous outbreaks of cholera in North Persia of like extent, had, as far as I am aware, been invariably followed, or accompanied by, the appearance of the disease in Russia. This was the case in 1823 and 1829; and in respect to the great diffusions in Russia of 1830-31, 1847-48, and of 1852-56. In 1830 and 1847, the disease extended from Persia to Russia, along the ordinary routes of commerce between the two countries, namely, through Transcaucasia, and by way of the Caspian to Astracan, and thence along the Volga, and the great internal system of navigation of Russia in Europe. The history of the diffusion of 1852-56, has never been worked out with the completeness of the two preceding it; but recent light thrown upon this subject, particularly in the Proceedings on the International Sanitary Conference of 1866, tends, I think, to the conclusion, that the recurring outbreaks of cholera in Russia during 1852-56, were probably in part due to importa-

* "L'opinion médicale en Russie est que l'épidémie actuelle n'est que la suite non interrompue et une recrudescence de celle qui fut importée en 1865 des ports de la Méditerranée dans ceux de la Mer Noire. Ce n'est point," dit M. Pelikan, "une épidémie nouvelle due à une importation de Perse, comme on le pense à tort à Constantinople; ce sont les queues de l'épidémie de 1865 qui, à l'instar de ce que nous avons vu antérieurement, font preuve d'une grande ténacité dans nos contrées. Ainsi la question que je posais il y a un mois semble bien résolue."—M. le Dr. Fauvel: *Bulletin de l'Académie de Médecine*, t. xxxvi, p. 694 (1871). The following account of the outbreak at Kiev, by Dr. Pelikan, was communicated to the Academy of Medicine by Dr. Fauvel, on the 21st December, 1869: "Vers la fin du mois d'Août, plusieurs cas de choléra furent signalés à Kiev parmi des ouvriers armuriers. Des cas analogues, mais en petit nombre, continuèrent à se manifester dans la ville jusqu'au milieu d'Octobre. Jusque-là les médecins considéraient ces cas comme étant des attaques de choléra sporadique, ou, pour parler plus clairement, de choléra nostras. A partir du 17 Octobre les cas devinrent plus nombreux, et jusqu'au 11 Décembre 115 furent admis dans les hôpitaux et donnèrent lieu à 63 décès. Pendant la même période il y eut dans la ville 59 morts occasionnés par la même maladie. En total 112 décès par le choléra, dans l'espace de deux mois, dans une ville importante. C'est là une épidémie, mais non pas une épidémie violente. La proportion de la mortalité paraît bien indiquer que la maladie était le choléra Asiatique. Dans plusieurs districts du Gouvernement de Kiev, des cas analogues, en très-petit nombre, furent observés çà et là."—*Bulletin de l'Académie de Médecine*, t. xxxiv, p. 1248 (1869). Dr. Mariscani states that during the warm months of spring, after the 28th May, nine fatal cases of cholera had occurred in Kiev, but these cases, as the early cases in the subsequent outbreak, were regarded as examples of sporadic cholera. Dr. Mariscani also states that the reported deaths from cholera in Russia, which in 1866 had numbered 88,352, and in 1867, 617, in 1868 fell to 38.—(*Sur le Choléra de 1869*. "Gazette Médicale de Paris," 1871, p. 194.)

tion and re-importation of the disease from Persia, and not solely to recrudescences of the diffusion of 1847-48. But, be this as it may, with the exception of the epidemic of 1865, the great diffusions of cholera in Russia have had so intimate a connection with the epidemic prevalence of the disease in North Persia, that when the recent diffusion of 1869-71 was observed to follow upon the general prevalence and unusual activity of cholera in North Persia, it was difficult to conceive that the two phenomena were unconnected. Further, it might be inferred from the observed facts of previous diffusions of cholera from Persia to Russia, that the diffusion in Russia in 1869-71, would probably prove to be a migration of the disease from North Persia along the ordinary routes of commerce between the two countries.*

The history of cholera in Persia since 1865 is of much interest in relation to the subject under consideration.

In 1865 cholera, according to the International Sanitary Conference, reached the two great centres of Shiite pilgrimage, Meshed Hussein (Kerbela) and Meshed Ali, in the pachalik of Bagdad, from the west. It accompanied the Persian pilgrims who, returning homewards from Mecca by way of Alexandria, Beyrout, and Aleppo, descended the Euphrates and the Tigris to the sacred spots. It accompanied also the pilgrims returning by the Arabian Ocean, and the Persian Gulf, and who ascended the Euphrates to the tombs of Ali and Hussein.† In the track of the former pilgrims the disease was developed at Aleppo,‡ and along the course of both rivers, attacking Biredjik and Anah-hit, upon the thinly populated banks of the Euphrates; and Orfa, Diarbeker, and Mosul, upon the more populous banks of the Tigris. In the tract of the latter pilgrims, cholera appeared at Mascot, Bassora, Kurna, Sook-el-Siook, Samavat, and Divanieh. The disease broke out at Meshed Ali and Meshed Hussein during the period of the influx of pilgrims there, and passed thence to Bagdad, Kerkook, Suleimanieh, and elsewhere on the Turco-Persian frontier, appearing in Suleimanieh at the close of October.

Late in the spring of 1866, cholera reappeared at Bagdad and Suleimanieh, and advanced northwards, spreading widely in Kurdistan. Passing into Persia, it attacked Souk-Boulak in June, and extended during the three following months to Urumiah, Tabriz, Resht, Kasbin, and the surrounding districts. In 1867, the disease becoming less prevalent, and, during the autumn, ceasing in the province of Azerbaijan, appeared in Tehran in June, and spread in two directions: eastwards through the province of Mazanderan into the province of Astrabad, and to the city of Astrabad; and southwards through Irak-Ajemi, attacking in succession Kashan and Ispahan. At the beginning of 1868 cholera still lingered in Mazanderan, and was present in Belfroosh. During the spring it became again active in this province, and spread gradually southwards and eastwards into the towns and villages along the road to Khorassan. In July the disease broke out with great violence in Meshed; and in August it appeared in Tehran, two days after the arrival there of a caravan of 5,000 pilgrims from Meshed.§ Later in the year cholera broke out in Yezd, also following upon the entrance into that city of a caravan of pilgrims from Meshed. During the autumn cholera prevailed in several parts of the provinces of Astrabad and Mazanderan, and

* The question of the origin in Europe of epidemic diffusions of cholera from a recrudescence of the disease persisting from a previous epidemic effusion, as, for example, the epidemic of 1852-56 from the epidemic which invaded Europe in 1847, and the recent diffusion from the epidemic of 1865, has been most fully discussed by Dr. Tholozan, in a recent Memoir (*Origine nouvelle du choléra Asiatique, ou début et développement en Europe d'une grande épidémie cholérique*, Paris, 1871); and in a series of papers published in the *Gazette Hebdomadaire de Médecine et de Chirurgie*, 1871 and 1872 (*Durée du Choléra Asiatique en Europe et en Amérique, ou persistance des causes productrices des épidémies cholériques hors de l'Inde*). Dr. Tholozan holds that the epidemic of 1852-56, and the diffusion of 1869-71, were recrudescences of the great epidemics which preceded them, or, in other words, that they were of indigenous origin (*de provenance indigène*).

† Dr. Colvill, at that time the Residency Surgeon at Bushire, in a report on the progress of cholera in the Persian Gulf in 1865, states that cholera extended also from Mecca along the pilgrim routes traversing Central Arabia, and that it attacked the towns of Oneyzah and Riad, and spread among the various tribes under Wahabee rule on the east coast of the Gulf.

‡ Cholera had broken out at Alexandria early in June, 1865, contemporaneously with the arrival and assemblage there of pilgrims, returning from Mecca, whose destination was other parts of the Mediterranean. At Beyrout cholera appeared in July among the fugitives from Alexandria and the pilgrims landed at Beyrout, bound for various parts of Syria, the more distant districts of Turkey in Asia, and Persia. Cholera had probably been introduced into the Aleppo a few days previous to the Persian caravan entering it. The first case, according to the International Sanitary Conference, occurred on the 15th August; according to the British Consul, on the 11th August. The Persian caravan, in a very unhealthy state, and carrying for interment at Meshed Hussein or Meshed Ali the corpses of pilgrims who had died during their pilgrimage, was allowed to enter the city on the 16th August, and on the evening of that day the epidemic broke out with great violence.

§ Meshed is an important centre of commerce, and one of the holy cities of Persia. It maintains a considerable trade with Afghanistan, Bokhara, and Balkh, and to the tomb of a highly venerated Shiite Saint, (Imam Reza), within its walls, large numbers of pilgrims resort annually in the summer months.

in November, Sari, the capital of the latter province, suffered severely. In December the disease was present at Hamadan and Burnjird, to the south-west of Tehran, and at Kerman, to the south of Yezd. In December, also, cholera was fatal at Herat.

In January 1869 the disease, which, in December of the preceding year, had advanced towards the Turco-Persian frontier at Hamadan and Burnjird, appeared nearer the frontier at Kermanshah; and, during the spring, it reappeared at various points in the district intervening between Hamadan and Burnjird. In the course of the summer and autumn following it was prevalent throughout the greater part of northern, western, and central Persia. Kermanshah, Kum, Kashan, Ispahan, Shiraz, and Bushire suffered in the west; Resht, Kasbin, Tehran, and the intervening districts in the north; Meshed in the north-east; and Yezd and the surrounding district in the centre. In the autumn, with the movement of the Persian pilgrims into Irak-Arabi, cholera passed the Turco-Persian frontier, and appeared in the houses, villages, and khans along the whole track traversed by them from Khanikin to Meshed Hussein and Meshed Ali. In December cholera broke out further to the south in Mohammera, at the juncture of the River Karun with the Shat-el-Arab. In 1870, the activity of cholera in west and central Persia was not exhausted. In April, its presence was reported at Kerman, and isolated cases occurred in Tehran; in the autumn it prevailed more or less in Kerman, Seidabad, Burnjird, Hamadan, Kum, and Kermanshah. Bender-Abbas suffered from the disease in December.

From 1865 to 1868 the general movement of cholera in Persia had been from west to east. With the return of the pilgrims from Meshed, in July 1868, cholera then being very fatally prevalent in that city, a reverse movement began, and with it indications of greater diffusiveness of the malady. This diffusion, in the course of 1869, spread over the greater portion of Northern, Western, and Central Persia, and throughout Irak-Arabi, in the pashalik of Bagdad. In the spring of 1871, the disease, as already described in a previous section (p. 2), had appeared at the head of the Persian Gulf, and spread northwards to Khanikin, on the Turco-Persian frontier. Meanwhile, in May, having spread from south to north over the greater portion of Irak Arabi, it reappeared in Tehran and Shiraz; and early in the summer it extended widely and very fatally in the provinces of Azerbaijan and Irak-Ajemi, prevailing in Khoi, Tabriz, Ardebil, Zenjan, Kasbin, Hamadan, and the adjoining districts. Tehran on this occasion suffered severely; *typhus* being prevalent at the same time. In the autumn cholera broke out in Amol and other places in the Province of Mazanderan, and in the neighbourhood of Astrabad.*

The persistence and recurring activity of cholera in Persia from 1866 to 1871, although paralleled by previous periods of long-continued prevalence of the disease, for example, from 1851 to 1861, has led some observers on the spot to question whether the malady is not becoming naturalized in Persia. I venture to express the opinion that the prevalence of cholera in Persia cannot be rightly studied without, at the same time, a study of the prevalence of the disease in India. Now, in 1867, cholera which had broken out with much fierceness among the multitude of pilgrims assembled at Hurdwar† for the great annual religious Hindu fair held there, followed in the track of the pilgrims returning northwards into Afghanistan, and towards the close of the year it was prevalent in Cabul. Again, in 1869, it became epidemic over the whole of the Bombay Presidency and Northern India, and had anew spread into Afghanistan. The great trade route between Persia and India, through Afghanistan, by way of Herat to Meshed, has been the track chiefly followed in previous invasions of Persia by cholera migrating from Northern India; and Meshed, from its large commerce, as the principal centre of trade between the two countries and Afghanistan, and also from its being the

* In May of this year the first intimation was received of the dreadful famine then existing in the provinces of Ispahan and Khorassan, and Dr. Castaldi, the Ottoman Sanitary Agent at Tehran, expressed the apprehension that "some new pestilence would be engendered by the continued action of unwholesome food eaten by the famished population, and the noxious effluvia arising from numerous corpses remaining unburied along open highways." In June, plague was first reported to exist at Bana, a village of Persian Kurdistan, in the district of Sekiz. It has been ascertained that this disease existed in parts of Persian Kurdistan in the winter of 1869, but the circumstances attending its development have not been clearly ascertained. Favoured by the existing famine, this pestilence, according to the latest accounts, would seem to have extended widely.

† The number of pilgrims who visited the Hurdwar fair of 1867 was unusually great. Their encampment on the banks of the Ganges occupied an area of 22 square miles, and it is estimated that not less than 2,800,000 were present on the great day of the festival. Writing of the return from Hurdwar, Dr. John Murray states that "the solid stream of pilgrims on foot, in hackeries, or on camels, which flowed along the road past Meerut (which is 80 miles distant) for nearly a week, was like the crowd of a London street."

focus of a great pilgrimage from all parts of Persia, has always played a very influential part in the diffusion of cholera when the disease has been introduced there. Unless it be assumed that the cholera which visited Afghanistan from India in the autumn of 1867 died out at the close of that year, it may be inferred that it would spread through Afghanistan into Persia in the course of the following year. The presence of cholera at Herat at the close of 1868 may, however, be accounted for by infection either from the east—a continuation of the stream of infection from India into Afghanistan the previous year—or from Meshed, from which we know that cholera began to radiate at the time of the great outbreak of July. As the known facts with regard to Meshed stand, cholera was most probably introduced there from the Caspian provinces in 1868, at the time of the pilgrimage, and in the third year of the epidemic prevalence of the disease in western and northern Persia. With the knowledge, however, that cholera had migrated into Afghanistan in the autumn of the previous year, considerable doubt must rest upon the assumption that the reawakened activity of the disease in Meshed, and its augmented diffusiveness, were solely due to the favourable conditions for the development of the malady arising from the congregation of pilgrims. Such phenomena as the outbreak in that city, and the diffusion of the disease from it as a newly migrating epidemic, following a direction the reverse of that of the epidemic of 1866-67 in Persia, are probably more consistent, beyond the limits of India, with the facts of newly imported actively migrating extensions of cholera, than of a revived activity of waning epidemics. At least the probability of the outbreak of cholera at Meshed in 1868, and the subsequent diffusion of the disease from that city, being an extension of the outbreak in Northern India in 1867, must be more completely eliminated before it is to be assumed that the epidemic spread of cholera in Persia and Irak Arabi in 1868-70, was a revivification of the epidemic of 1865-67.

Again, the outbreak of cholera in Irak-Arabi at the close of 1870, and its extension along the courses of the Euphrates and Tigris into Kurdistan, and prevalence in Northern Persia the following year, cannot well be considered without reference to the general diffusion of cholera in Western India in 1869. Our knowledge of cholera on the shores of the Persian Gulf, and along the coasts of Laristan and Mekran, is, however, unfortunately, almost as imperfect as our knowledge of its prevalence in Afghanistan; and no information appears to exist as to the probable influence, as cholera carriers, of the Indian contingent of pilgrims to Meshed Ali and Meshed Hussein.* Here we can only grope tentatively towards the light; but I think, having regard to the most clearly-ascertained habits of cholera beyond the limits of India, the obscurity enveloping the persistence and recurring activity of cholera in Persia attaches less to the assumption of re-importation, and renewed activity of the disease thereupon, than to the assumption of recrudescence or of naturalization.

The parallelism between the persistency and recurring activity of cholera in Persia and Russia is obvious; and I believe that the explanation of the phenomena in the one case is to be traced, with the greatest chance of success, in the same direction as the explanation in the other. At any rate I hold that, in Russia as in Persia, before adopting the hypothesis of recrudescence to explain diffusions of cholera similar to that which occurred in the former country in 1869-71, and in the latter in 1868-70, the better understood effects of re-importation during the migratory periods of the disease must be more clearly excluded.

The reappearance of cholera in an active form in Russia in 1869, at a time when the disease was prevalent in Northern Persia, was a fact which, as I have previously remarked, whether regarded alone or in the light of previous diffusions of the disease in Northern Europe, could not well be regarded as an isolated phenomenon. The locality of the reappearance, however, Kiev, an inland town of South Russia, and the absence, so far as I am aware, of any extension of cholera across the Russo-Persian frontier or to the Russian coast of the Caspian, in either 1868 or 1869, appeared, on the first aspect, to shut out absolutely any connection by importation in the ordinary course of traffic between the two countries.

* Cholera is believed, with much probability, to have been introduced into Bender Abbas, in December 1870, from Kerman, where the disease was prevalent. In raising the question of the introduction of cholera into Irak Arabi from India, by way of the Persian Gulf, I am fully aware of the important statement of Dr. Tholozan, made in 1869, of the great rarity with which the Persian ports on the Gulf have been infected with the disease from India.—*Prophylaxie du Choléra en Orient*, 1869, p. 42.

Although fully impressed with these facts, before accepting the alternative hypothesis of recrudescence, it seemed to me, keeping steadily in view the clearly determined facts of previous diffusions of cholera from Persia to Russia, and generally beyond the limits of India, that it was desirable to ascertain if any change had taken place in the direction of traffic from Persia to Russia in Europe. The principal routes of traffic between the two countries, so far as I was aware (and my knowledge in this respect was apparently confirmed by the information on the subject laid before the International Sanitary Conference in 1866), were (1) from the Caspian ports of Persia and through Transcaucasia and its ports on the Caspian, and by the highway across the Caucasus, to Astracan; and (2) from Tabriz through Turkish territory to Trebizond, and thence by the Black Sea. Along the former of these routes cholera had travelled into Europe in 1829, 1830, and 1847;* along the Trebizond route cholera has never, I believe, spread to Europe. For further information on this subject, I examined the commercial Reports, for the fifteen years 1856-71, of Her Majesty's Consuls in North Persia, Transcaucasia, and the different ports of the Black Sea and Sea of Azov; also the Reports, for the same period, of Her Majesty's Secretary of Legation in Tehran, of the Secretary of the British Embassy for Russia, and of the Consul for St. Petersburg. The result of this examination was to elicit the important and to me entirely new fact, that, since 1864, there has been a great displacement in the direction of traffic between Persia and Russia in Europe. Previous to the date given the main lines of traffic were in the directions already described, namely, by way of Astracan and by way of Trebizond; but, since 1864, the traffic has been largely diverted from these routes, to routes traversing Transcaucasia to the coast of the Black Sea at Poti, and thence to the ports of South Russia. For several years, it would appear, the Russian Government has devoted much energy to the development of Poti as the principal trading port between its European provinces and Persia, and to this end it has, by the construction and maintenance, in Transcaucasia, of roads, and by other means, largely facilitated the traffic from the Persian frontier to Poti. Moreover, the same facilities have led, it would seem, to Baku becoming a port of import for the produce of the Caspian provinces of Persia, instead of as formerly a port chiefly for the transmission of Persian produce to Astracan.† For now much of the traffic of these provinces, in place of being conducted by way of Astracan and the Volga, is conducted by way of Baku and Poti. Still further to develop the traffic from Persia, along the Poti route, a railway has been projected by the Russian Government from Poti to Baku, by way of Tiflis and Elizabetopol; and the first portion of this line from Poti to Tiflis, it is anticipated, will be completed and brought into use in the course of the present year.

Writing of this diversion of traffic in its relation to the trade of Trebizond, Mr. Consul Palgrave said, in March 1871, "The commercial importance of Trebizond, depending almost entirely on the Persian transit, must, of necessity, come to an end should that transit be diverted elsewhere. The catastrophe, long threatened, seems now, in fact, near at hand. The Russian Poti-Tiflis Railroad, the harbour works at Poti, and other analogous undertakings, all combining to draw Persian trade into the Russo-Caucasian channel, have, in spite of many delays and much mismanagement, made considerable progress during the last twelve months, and are steadily advancing. To enterprises like these, conducted by English skill and Russian tenaciousness, the feeble, ill-planned, and worse executed Trebizond-Erzurum highroad, can offer no serious counterpoise. When once the Russo-Persian lines of traffic—the one by Resht and Baku, the other by Elizabetopol—both centering at Tiflis—are brought into railroad communication with the sea coast at or near Poti, the Trebizond-Tabreez transit will be, it

* M. Sawas, one of the Persian delegates at the International Sanitary Conference, asserted that cholera had also extended from Persia to Astracan in 1852. But this statement does not appear to have been confirmed.

† Mr. Lumley, the Secretary to Her Majesty's Embassy in Russia, in a report dated January 1865, says,—“Free transit being established across the Caucasus from Poti to Baku, greater facilities are now offered to trade between the Black Sea and the Caspian with Persia, and even with India by Meshed.”—*Commercial Reports*, No. 8, 1865, p. 102. It must be noted that the port of Astracan is closed by ice from the middle of October to the middle of April, and that steam traffic on the Caspian during this half of the year is confined to a monthly communication between Baku and Ashuradé and the intermediate ports. Mr. Consul Abbott, in his report on the trade of the province of Ghilan for 1865, states that “the Caspian route from Enzellee to Baku and thence via Tiflis to Poti, has of late become much in vogue, more especially since the steamers in the Caspian have reduced rates of freight; and the Russian Government, by holding out every kind of encouragement to the merchants, such as exemption of Custom duty, &c., are doing all in their power to direct the transit trade in this latter direction.”—*Commercial Reports*, August to December, 1866, p. 106.

cannot reasonably be doubted, a thing of the past. Already matters are unmistakably tending in that direction.”*

Now, the reappearance and diffusion of cholera in South Russia in 1869-71, following close upon or accompanying the most considerable prevalence of cholera in North Persia since the diffusion of the disease in both countries in 1865-67; and, also, upon the development of a comparatively direct, and more quickly traversed route of traffic between Persia and South Russia, is certainly a remarkable coincidence—one of those coincidences, indeed, which, if thoroughly examined, may lead to important results. The data in my possession help little towards such an examination. As I have already remarked, the locality of the re-appearance, Kiev, and the absence, so far as I am at present aware, of any extension of cholera across the Russo-Persian frontier, in 1868 and 1869, and, I would add, of its appearance in any of the ports of South Russia, prior to the outbreak at Kiev, seem at first sight to present an insuperable difficulty to the assumption that the diffusion of cholera in Northern Europe in 1869-71 might be an extension of the disease from Persia. But I would observe, first, that this difficulty may arise largely from the imperfection of the data at my command; and next, in respect to Kiev, that this city was connected by railroad with Odessa in 1869. Railway communication, I may also state, was opened the same year between Taganrog and Kursk. The facility and rapidity of communication effected by steam, both on land and at sea, unquestionably exercise a very important, and not at all times easily understood influence upon the dissemination of cholera. In 1866, cholera, in an undetected form, was carried from districts of Germany, by way of Hamburgh, across the German Ocean and this country, and across the Irish Sea, four days' sail into the Atlantic, in the case of the steam-ship

* *Commercial Reports received at the Foreign Office from Her Majesty's Consuls in 1871*, p. 738. As an indication of the amount of trade flowing from Persia along the trade routes by way of Astracan and by way of Transcaucasia, I subjoin the following Table of the value of the imports during the six years 1865-69, across the Transcaucasian frontier, by Astracan, and by Baku (compiled from the “Statistical Tables relating to Foreign Countries,” published by the Board of Trade, and from returns courteously furnished to me by the Statistical Department of the Board). I am not able to give the imports from Persia to Russia by the Tabriz-Trebizond route, but Mr. Palgrave's statement leaves no doubt that much of the increase in the trade across the Transcaucasian frontier has arisen from abandonment of this old route. Indeed, in his Report for 1868, Mr. Palgrave attributes a diminution of upwards of 500,000*l.* in the total value of the exports of that year by steam-vessels from Trebizond, as compared with the previous year, mainly to “the successful competition exerted by the Russo-Persian transit line *vid* Poti.”—*Commercial Reports*, 1869, p. 429. The following year, 1869, there was a further diminution of the total value of the exports by steam-vessels of 239,000*l.* as compared with 1868. The diminished value of the exports from Trebizond in the two years named would appear to have depended upon the smaller quantity of specie exported, for Mr. Palgrave's report for 1869 shows, that although the value of the goods exported in 1869 was 200,000*l.* less than in 1868, the value of the goods exported in the last-named year was 270,000*l.* greater than in 1867.—*Commercial Reports*, 1870, p. 559. “Nine-tenths of the steamers export and import at Trebizond,” writes Mr. Palgrave, “has reference to the Persian traffic.”—*Commercial Reports*, 1869, p. 430. The returns for Astracan show much uniformity of the traffic to that port; those for Baku considerable fluctuations, depending, probably, in great measure upon variations in the produce of the silk crop in the province of Ghilan. In ordinary years, at ordinary prices, the silk crop in this province, has, according to Mr. Consul-General W. G. Abbott, an approximative value of from 600,000*l.* to 700,000*l.* The value of the silk crop in 1863 may be estimated at 700,000*l.* In 1864 its approximate value was 1,059,310*l.*; in 1865, 644,177*l.* The following year, when the silkworm malady became prevalent, the value of the crop was less than half that of 1864; and, in 1871, it fell to 140,307*l.* In 1868 there was a slight increase in the productiveness of the crop; and, in 1869, its value was estimated at 198,461*l.*—*Commercial Reports*: Her Majesty's Secretary of Legation, Tehran, 1864; Mr. Consul-General E. Abbott, 1867; and Mr. Consul W. G. Abbott, 1869. Much of the silk imported into Baku would doubtless be consumed in the province of that name; for, in 1864, this province contained 188 of the 211 silk manufactories then existing in Transcaucasia, the whole number of silk manufactories in the Russian Empire being, at this time, 289.—Mr. Consul T. Michell, *Commercial Reports*, 1868, p. 293. Mr. Consul-General Jones, in his report on trade in the province of Azerbaijan, in 1870, gives a painful description of the ruin brought upon the agricultural population of Persia, and the arrest of commercial enterprise in the country from the famine now prevailing there, “a calamity,” he writes, “following close on the destruction of the silk trade of Ghilan, which, until lately, formed the staple industry of Persia.”—*Commercial Reports*, 1871, p. 961.

Table showing the Total Value of Imports for Home Consumption by the Transcaucasian Frontier, by Astracan, and by Baku during the six years 1865-69.

Frontiers.	Average Annual Value of Imports, 5 years 1859-63.	1865.	1866.	1867.	1868.	1869.
	Sil. Roubles.	Sil. Roubles.	Sil. Roubles.	Sil. Roubles.	Sil. Roubles.	Sil. Roubles.
Transcaucasian Frontier ..	5,451,457	7,599,388	8,338,212	8,732,093	9,050,722	10,716,147
Astracan ..	1,050,387	1,373,606	1,569,034	1,285,701	1,180,000	1,470,000
Baku ..	(1863) 741,756 (1864) 1,784,352	} 780,000	812,000	903,000	486,000	764,000

"England," and six days' sail in the case of the steamship "Virginia," before it showed itself in its well understood character. Facts like these prove that when the disease appears in the interior of a country, at a distance from a region where it is prevailing epidemically, and even separated from that region by an intervening sea, considerable caution must be exercised before coming to the conclusion that the malady was not imported, if the seat of outbreak in the interior is in free communication with the coast, and with the infected region.

But adopting Dr. Pelikan's statement that cholera had never been extinct in Russia from the introduction of the disease in 1865 to the outbreak at Kiev, in 1869, the question arises whether there may not still have been, as was probably the case in Persia in 1868, a re-importation or re-importations of the disease from Persia in 1869 or 1870, which determined its renewed diffusiveness in the latter year and in 1871.

I have not the data, however, which would permit me to discuss this question. My present object is to direct attention to the coincidence of the outbreak in South Russia in 1869, with the wide prevalence of the disease in North Persia, and the establishment of a direct, and more rapidly traversed route of traffic between South Russia and Persia. I suggest that a more probable explanation of the outbreak in South Russia in 1869 or 1870, and of the subsequent large diffusion of the disease in Northern Europe, is to be sought in the movement of cholera, in some way as yet unknown, along this route into Russia, rather than in the assumption, less consistent with our knowledge of the sources of epidemic diffusion of the disease beyond the limits of India, of the recrudescence of the well-nigh extinguished epidemic of 1865.

If this suggestion be correct (and even apart from this suggestion) the establishment of the route by way of Poti and the ports of South Russia as the principal line of traffic between Persia and Russia is a matter which seriously affects the sanitary welfare of Europe, particularly when considered in connection with the development of railway communication between Central Europe and the Russian coast of the Black Sea. By the completion of the line of railway between Odessa and Kiev in 1869, continuous railway communication was established through Russia, between Northern Germany, and the principal Russian port on the Black Sea; and, by the recent completion of a railway between Odessa and Jassy, the former place has been brought into connection, by way of Cernowitz, with the railway system of North Germany and Western Europe, and a direct railway route established between the coasts of the North Sea and of the Black Sea. In proportion as the projected line of railway between Poti, Tiflis, Elizabetopol, and Baku is carried out and brought into operation, the present augmented speed of traffic between Persia and Russia will be further accelerated, and Persia be brought into closer connection with Europe. With the completion of the Transcaucasian Railway it may be anticipated that this will follow (to use, Sir, a modification of one of your own phrases applied to the relation of the Continent to this country in respect to infectious diseases), namely, *contagions current in Persia will become current in Europe.*

From this point of view the internal state of Persia, and the recurring famines which afflict its population, will become a subject of nearer interest and greater moment to European nations than was apprehended even by the International Sanitary Conference of 1866.

I have, &c.
(Signed) J. NETTEN RADCLIFFE.

*Medical Department of the Local Government Board,
London, May 7, 1872.*

